

**Methods:** The data of nosocomial infections collected from 2004 to 2013 were analyzed and the resistant strains of MRSA (methicillin resistant *S. aureus*), *E. coli*-ESBL, *Klebsiella pneumoniae*-ESBL (extended-spectrum  $\beta$ -lactamase), CRAB (carbapenem-resistant *Acinetobacter baumannii*) and CRPA (carbapenem-resistant *P. aeruginosa*) were mainly discussed.

**Results:** The outcome show that for MRSA the resistant rate decreased annually from 73.96% (71/96) to 48.0% (24/50); for *E. coli*-ESBL the resistant rate increased annually from 27.5% (28/102) to 33.9% (39/115); for *K. pneumoniae*-ESBL the resistant rate increased annually from 33.8% (25/74) to 48.1% (25/52). The changes of CRAB resistant rate were large; in 2004 the rate was 55.3% (13/38); from 2005 to 2007 the average annual rate was 14.3%; in 2009 the rate was 53.6% (15/28); in 2013 the rate was 32.5% (13/40); the average rate for the whole hospital was 29.5%; the average rate for ICU was 36.5%. The resistant rates of CRPA were from 0 to 15%.

**Conclusions:** By providing the data of the trends of resistant strains to the clinicians for choice of first line empiric treatment, we hope that infection can be more effectively prevented and controlled.

## PS 2-507

### RELATIONSHIP BETWEEN NOROVIRUS AND MRSA INFECTION AND METHODS OF INFECTION CONTROL IN SPECIAL NURSING HOMES FOR THE ELDERLY IN JAPAN

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**Objective:** To elucidate the relationship between norovirus and MRSA (the status of methicillin-resistant *Staphylococcus aureus*) infection and methods of infection control in special nursing homes for the elderly

**Methods:** In 2013, we conducted questionnaires by mail to 1,183 facilities. On the basis of their responses, the correlation between norovirus and the status of MRSA infection after the execution of infection control measures was evaluated with the use of a chi-square test and the calculation of the odds ratios. ( $p < 0.05$ )

**Results:** 439 facilities provided valid responses. The chi-square test showed that infectious gastroenteritis due to norovirus is positively correlated with nine conditions such as "the infection control supervisor participates in OJT (on-the-job training) programs". Negative correlations were observed with three conditions included "the infection control supervisor sends regular emails regarding infection control". The onset of MRSA is positively correlated with three conditions included "opportunity to exchange opinions of infection control". Negative correlations were observed with two conditions included "acquisition of information of infectious diseases than letters are distributed from local governments".

**Discussion:** Practical training and OJT programs were effective means of preventing norovirus infections. The positive correlation between the onset of MRSA infection and these training programs suggests that facilities have introduced improvement policies on the basis of their experience with past infections. In addition, the correlations observed between MRSA infections and some measures adopted in these facilities, such as participation in external trainings and obtaining reports on infection control, underscore the limited knowledge and information regarding MRSA itself.

## PS 2-508

### EFFECT OF INTERMITTENT COPPER-SILVER IONIZATION FOR LEGIONELLA COLONIZATION IN WATER DISTRIBUTION SYSTEM AT A MEDICAL CENTER IN SOUTHERN TAIWAN

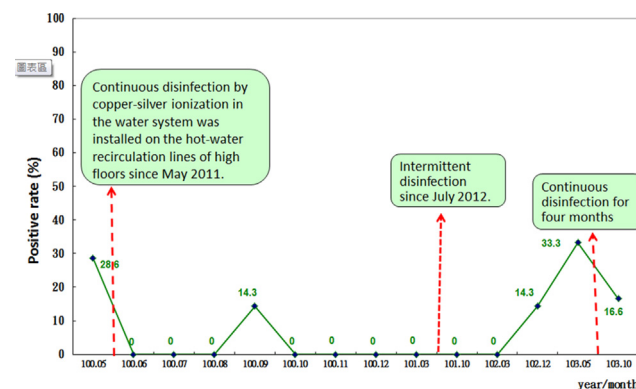
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**Purpose:** Legionnaires in the water supply system in medical institutions may cause infections in high-risk patients. Copper-silver ionization has been proved to be effective in eradication of Legionnaires from hospital water system. According to the literature, after the ionization unit was inactivated, the residual effect may sustain for as long as 6-8 weeks. We aim to evaluate the efficacy of intermittent disinfection in eradication of Legionnaires in hospital water system.

**Methods:** The study hospital is a medical center with 1275 beds in southern Taiwan. One set of copper-silver ionization system was installed on

the hot-water recirculation line of high floors in May 2011. Distal water samples were collected according to the guide of Taiwan CDC. After continuous operation for 13.5 months, the disinfection system was turned on for one month and then turned off for two months inactivation, four cycles in a year. The disinfection efficacy was evaluated by surveillance culture of distal water.

**Result:** After copper-silver disinfection for a month, the positive rate of *Legionella* growth in water samples reduced from 28.6% to 0%. During the initial periods of continuous disinfection, one positive point (14.3%) was cultured at the fourth month. During the months of intermittent disinfection, *Legionella* isolates were cultured from two samples at the 6th and 7th month, respectively. Since then, continuous disinfection continued for another four months, *Legionella* colonization rate in water declined (16.6%). Either by continuous or intermittent disinfection, there was no healthcare-associated Legionnaires' disease in the study period.



**Figure.** Surveillance cultures of Legionnaires in the hospital water system and different strategies of copper-silver ionization of water system.

**Conclusions:** The results showed that copper-silver ionization disinfection method is an effective method, and intermittent disinfection can be considered to a cost-effective strategy in preventing *Legionella* colonization in hospital water system. However, resistance to copper or silver ion will be the potential issue warranting further studies.

## PS 2-509

### CENTRAL VENOUS CATHETER-RELATED BLOODSTREAM INFECTION IN PATIENTS UNDERGOING GASTROINTESTINAL SURGERY

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**Purpose:** Catheter-related bloodstream infection (CRBSI) is a leading cause of bloodstream infection that causes a great deal of morbidity. This prospective observational study was designed to assess the incidence of, risk factors for, and pathogenesis of CRBSIs after gastrointestinal surgery in China.

**Methods:** We conducted a prospective study in the Affiliated Hangzhou Hospital of Nanjing Medical University, a 1500-bed tertiary hospital in Zhejiang, China. All patients who underwent gastrointestinal surgery with CVC insertion for more than 2 days were monitored daily for development of CRBSI between January 2013 and June 2014. Data included potential risk factors, and microbiological culture results were analyzed.

**Results:** A total of 477 patients undergoing gastrointestinal surgery, and 6,833 CVC catheterdays were prospectively surveyed. The overall CRBSI rate was 8.0% (38/477), with 5.6 per 1,000 catheter-days. According to multivariate analysis, male patients (OR = 2.41; 95% CI 1.00-5.79;  $P = 0.049$ ), emergency surgery (OR = 3.96; 95% CI 1.01-15.51;  $P = 0.048$ ), duration of CVC days (OR = 1.08; 95% CI 1.04-1.13;  $P < 0.01$ ) were risk factors for CRBSI. Two of the 38 CRBSIs (5.3%) were polymicrobial. The most common organisms were gram-positive ( $n = 18$ ; 45.0%), with the most frequent